



Prevalence of Pelvic Ring Fracture Detected by Radiographical Imaging

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Abstract: This study aimed to know the Prevalence of pelvic ring fracture detected by radiographical imaging. From 1237 fracture cases, One hundred ten MRI exams over the course of a three-year period from 2021, to 2023. Age, gender and presence of other diseases were recorded. Inclusion criteria included receiving radiography of the hip, pelvis, or femur in the emergency room, followed by diagnostic MRI of the hip or pelvis within one calendar day. All MRI and radiographic tests were carried out at a single special clinic. The current study showed that pelvic ring fractures were occurred at percentage 8.9 from all fracture cases, and the prevalence of ring fractures was more in elderly age groups more than 40 years. The present study showed that fractures were more prevalent in females than males. The results also showed that 101 (91.8%) patients were suffered from osteoporosis.

In conclusion, the pelvic ring fractures were mostly prevalent in female than male especially in elderly patients.

Key words: pelvic ring, fracture, sex, age.

Introduction:

Traumatic Pelvic Ring Injury (TPRI) is a common term used in trauma research to describe pelvic and acetabular fractures [1]. The reported incidence of TPRI ranges from 17 to 37/100 000 person-years [2–6]. The complicated architecture of the pelvis, the location of the pelvis' bony and ligamentous components deep inside the surrounding soft tissue, and the close proximity to the pelvis' significant neural and vascular systems make pelvic surgery challenging [7,8]. These fractures were nonoperatively treated up until a few decades ago [9–12]. Historically, non-operative treatment of traumatic pelvic fractures has had poor outcomes, often leading to persistent instability, non-union, mal-union, chronic discomfort, and leg length discrepancy, among other problems [10, 11].

Low or high energy trauma may result in pelvic fractures [2]. In senior osteoporotic individuals, the low energy type often manifests. Particularly in young, healthy people, a subset of pelvic fractures is caused by severe or high-energy trauma. In a young patient, the bony pelvis is surrounded by large muscles and strong ligamentous structures, requiring a significant amount of force to break [9].

Different categories are used to categorize pelvic fractures. Using the energy vector (Young-Burgess Classification) or the pattern of instability (AO/Tile) are the two classification methods that are most often used [7, 9].

Young and Burgess identified the typical pelvic fracture patterns and discovered that the eventual deformity is determined by the energy vectors. The pelvis may be compressed from the side, causing a Lateral Compression (LC) type fracture, from the front or back, causing an Antero-Posterior Compression injury (APC), or from the vertical direction, causing a Vertical Shearing (VS) type damage[9].

According to the AO/Tile classification, pelvic fractures fall into one of three categories: Type A fractures are stable (vertically and rotationally), Type B fractures are unstable (rotationally), or Type C fractures are unstable (vertically and rotationally)[7].

Historically, pelvic fractures have been regarded as dangerous wounds with a high death rate[13–18]. When examining mortality after pelvic injuries, bleeding has been the major focus[19–22]. The majority of the bleeding reports have come from the early stages of treating these wounds. Pelvic fractures and other accessory injuries have often been linked, beyond this first phase, to catastrophic sequelae such multiple organ failure, sepsis, and ultimately death[8, 23].

According to reports, the majority of pelvic fracture patients pass away in the first and middle stages and often just after being admitted. The death generally happens during the first 30 days after a serious trauma. This is the cause of the frequent occurrence of reports in the literature of 30-day mortality after significant trauma [24].

Issues that arise after discharge and during follow-up are often addressed during the late stage of pelvic trauma care. When treating pelvic fractures surgically, internal fixation should remain in place throughout the healing process. Uncomplicated wound healing is expected. The late phase's objective is to go back to how things were before the injury. Implant failure, fracture non-union, late infections mostly brought on by low pathogenic bacteria, and severe pain are all possible [10, 25–29].

When treating pelvic fractures, a multidisciplinary approach is often necessary throughout these three stages (early, middle, and late). The aforementioned factors mean that TPRI treatment is often centralised to trauma centres with access to all required medical and surgical disciplines [30–34].

This study aimed to know the Prevalence of pelvic ring fracture detected by radiographical imaging.

Materials and Methods:

From 1237 fracture cases, One hundred ten MRI exams over the course of a three-year period from 2021, to 2023. Age, gender and presence of other diseases were recorded. Inclusion criteria included receiving radiography of the hip, pelvis, or femur in the emergency room, followed by diagnostic MRI of the hip or pelvis within one calendar day. All MRI and radiographic tests were carried out at a single special clinic.

Results:

The current study showed that pelvic ring fractures were occurred at percentage 8.9 from all fracture cases, and the prevalence of ring fractures was more in elderly age groups more than 40 years (Table 1).

Table 1. Prevalence of pelvic ring fractures according to the ages

Age group	Number	percentages
Less than 40 years	8	7.3%
More than 40 years	102	92.7%
Total (1237)	110	8.9%

The present study showed that fractures were more prevalent in females than males (Table 2).

Table 2. Prevalence of pelvic ring fractures according to the sex

Sex	Number	percentages
Male	38	34.5%
Female	72	63.5%
Total	110	100%

The results also showed that 101 (91.8%) patients were suffered from osteoporosis.

Discussion:

Pelvic ring fractures are seldom isolated in high-energy blunt trauma, but they are often accompanied with injuries to the brain, lung, spleen, kidney, liver, long bones, as well as thoracic aorta [4,5]. Hemodynamic instability, sepsis, and multiorgan failure are all factors that contribute to the 5–16% overall mortality rate of this kind of trauma [6].

When comparing 24,059 patients with unstable pelvic ring fractures using ICD-9 Clinical Modification Codes, researchers found that the incidence rates of open vs closed pelvic fractures ranged between 7.6% and 92.4% [14]. Regarding combat trauma, U.K. combat research found that dismounted troops who were taken to a field hospital as a result of blast injuries from IED explosions had an overall incidence rate of 7.4% [15]. These were in agreement with results of current study. While the results were disagreement with other results that showed about 3% of all fractures affect the pelvic ring [9,10].

It has been shown that 94% of pelvic fractures in a group of individuals over 60 years old are related to osteoporosis, and that around 7% of all osteoporotic fractures include the pelvic ring [15–17].

After correcting for age, race, rank, and service, females had a 2 times greater incidence of pelvic ring fractures than men did. The statistics from studies of the older population support the greater frequency in females [1,7,11–13]. Additionally, previous research has revealed that female recruits are more likely than male recruits to sustain pelvic ring fractures [23–25]. It is commonly accepted that women are more likely to sustain bone stress fractures, particularly via non-traumatic processes [26,27].

The current results showed that pelvis ring fractures were more prevalent in elderly patients than 40 years, these were in agreement with those of [11-13], who reported that fractures are associated with the elderly population, as age-related problems such as falling and osteoporosis are the main causes of injury to this population. Also, [35] concluded that with increasing age the risk of sustaining one of these fractures increases exponentially.

Conclusions:

The pelvic ring fractures were mostly prevalent in female than male especially in elderly patients.

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